

# Attachment 1 - Avtex Fibers Operable Unit 10

## OU-10 Site-Specific Soil Cleanup Standards for Direct Contact and Ground Water Protection

Parameter	Carcinogen Or Non- Carcinogen	Human Health Direct Contact Standard <sup>1,2</sup> (mg/kg)		Ground Water Protection Standard <sup>3</sup> (mg/L)		Target Organ <sup>5</sup>
		1x10 <sup>-6</sup> Cancer Risk and/or Hazard Quotient =0.1	1x10 <sup>-5</sup> Cancer Risk and/or Hazard Quotient =1.0	RBC or MCL <sup>4</sup>		
<b>TCL Volatile Organics</b>						
1,1,2,2-Tetrachloroethane	c	29	290	0.000053	RBC	
1,1,1-Trichloroethane	nc	57,000	570,000	0.2	MCL	
1,1,2-Trichloroethane	c	100	1,000	0.005	MCL	
1,1-Dichloroethane	nc	20,000	200,000	0.8	RBC	
1,1-Dichloroethene	nc	10,000	100,000	0.007	MCL	
1,2-Dibromo-3-chloropropane	c	4.1	41	0.0002	MCL	
1,2-Dibromoethane	c	0.068	0.68	0.00000075	RBC	
1,2-Dichloroethane	c	63	630	0.005	MCL	
1,2-Dichlorobenzene	nc	18,000	180,000	0.6	MCL	
1,2,4-Trichlorobenzene	nc	2,000	20,000	0.07	MCL	
1,3-Dichlorobenzene	nc	6,100	61,000	0.18	RBC	
1,4-Dichlorobenzene	c	240	2,400	0.075	MCL	
1,2-Dichloropropane	c	84	840	0.005	MCL	
2-Butanone (MEK)	nc	120,000	1,200,000	1.9	RBC	
2-Hexanone	nc	8,200	82,000	1.5	RBC	
4-Methyl-2-pentanone (MIBK)	nc	16,000	160,000	2	RBC	
Acetone	nc	20,000	200,000	0.61	RBC	
Benzene	c	100	1,000	0.005	MCL	
Bromochloromethane	-	NV	NV	NV		
Bromodichloromethane	c	92	920	0.08	MCL	
Bromoform	c	720	7,200	0.08	MCL	
Bromomethane	nc	280	2,800	0.0085	RBC	
Carbon disulfide	nc	20,000	200,000	1	RBC	
Carbon tetrachloride	c	44	440	0.005	MCL	
Chlorobenzene	nc	4,100	41,000	0.1	MCL	
Chloroethane	c	2,000	20,000	0.0036	RBC	
Chloroform	nc	2,000	20,000	0.08	MCL	
Chloromethane	c	NV <sup>7</sup>	NV <sup>7</sup>	0.19	RBC	
cis-1,2-Dichloroethene	nc	2,000	20,000	0.07	MCL	
cis-1,3-Dichloropropene <sup>6</sup>	c	57	570	0.00044	RBC	
Dibromochloromethane	c	68	680	0.08	MCL	
Ethylbenzene	nc	20,000	200,000	0.7	MCL	
Methylene chloride	c	760	7,600	0.005	MCL	
Styrene	nc	41,000	410,000	0.1	MCL	
Tetrachloroethene	c	280	2,800	0.005	MCL	
Toluene	nc	41,000	410,000	1	MCL	
trans-1,2-Dichloroethene	nc	4,100	41,000	0.1	MCL	
trans-1,3-Dichloropropene <sup>6</sup>	c	57	570	0.0004	RBC	
Trichloroethene	c	14	140	0.005	MCL	
Vinyl chloride	c	7.9	79	0.002	MCL	
Xylenes (total)	nc	41,000	410,000	10	MCL	
<b>TCL Semivolatile Organics</b>						
1,2-Diphenylhydrazine	c	7.2	72	0.000084	RBC	
2,2'Oxybis (1-Chloropropane)	-	NV	NV	NV		
2,4,5-Trichlorophenol	nc	20,000	200,000	3.7	RBC	
2,4,6-Trichlorophenol	c	520	5,200	0.0061	RBC	

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		1x10 <sup>-6</sup> Cancer Risk and/or Hazard Quotient =0.1	1x10 <sup>-5</sup> Cancer Risk and/or Hazard Quotient =1.0	RBC or MCL <sup>4</sup>		
2,4-Dichlorophenol	nc	610	6,100	0.11	RBC	Decreased weight effects (1)
2,4-Dimethylphenol	nc	4100	41,000	0.73	RBC	
2,4-Dinitrophenol	nc	410	4,100	0.073	RBC	
2,4-Dinitrotoluene	nc	410	4,100	0.073	RBC	
2,6-Dinitrotoluene	nc	200	2,000	0.037	RBC	
2-Chloronaphthalene	nc	16,000	160,000	0.49	RBC	
2-Chlorophenol	nc	1,000	10,000	0.03	RBC	
2-Methylnaphthalene	nc	4,100	41,000	0.12	RBC	
2-Nitroaniline	-	NV	NV	NV		
2-Nitrophenol	-	NV	NV	NV		
3,3'-Dichlorobenzidine	c	13	130	0.00015	RBC	Liver effects (2)
3-Nitroaniline <sup>8</sup>	nc/c	61/286	613/2860	0.0033	RBC	
4,6-Dinitro-2-methylphenol	nc	20	200	0.0037	RBC	
4-Bromophenyl phenyl ether	-	NV	NV			
4-Chloroaniline	nc	820	8,200	0.15	RBC	
4-Chlorophenyl phenyl ether	-	NV	NV			
4-Nitroaniline	c	290	2,900	0.0033	RBC	
4-Nitrophenol	nc	1,600	16,000	0.29	RBC	
Acenaphthene	nc	12,000	120,000	0.37	RBC	
Acenaphthylene	-	NV	NV			
Anthracene	nc	61,000	610,000	1.8	RBC	Skin effects (4, 8)
Benzidine	c	0.025	0.25	0.00000029	RBC	
Benzo(a)anthracene	c	7.8	78	0.000092	RBC	
Benzo(a)pyrene	c	0.78	7.8	0.0002	MCL	
Benzo(b)fluoranthene	c	7.8	78	0.000092	RBC	
Benzo(g,h,i)perylene	-	NV	NV	NV		
Benzo(k)fluoranthene	c	78	780	0.00092	RBC	
bis(2-Chloroethoxy)methane	-	NV	NV	NV		
Bis(2-chloroethyl)ether	c	5.2	52	0.0000096	RBC	
Bis(2-chloroisopropyl ether)	c	82	820	0.00026	RBC	
Bis(2-ethylhexyl)phthalate	c	410	4,100	0.006	MCL	Increased liver & brain weight effects (2)
Butylbenzyl phthalate	nc	41,000	410,000	0.0073	RBC	
Carbazole	c	290	2,900	0.0033	RBC	
p-Chloro-m-cresol	-	NV	NV			
Chrysene	c	780	7,800	0.0092	RBC	
Di-n-butylphthalate	nc	20,000	200,000	3.7	RBC	
Di-n-octyl phthalate	nc	4,100	41,000	0.73	RBC	
Dibenz(a,h)anthracene	c	0.78	7.8	0.0000092	RBC	
Dibenzofuran	nc	400	4,000	0.012	RBC	
Diethylphthalate	nc	160,000	1,600,000	29	RBC	
Dimethyl phthalate	nc	2,000,000	20,000,000	370	RBC	Gastrointestinal and neurological effects (7)
Fluoranthene	nc	8,200	82,000	1.5	RBC	Liver & kidney & blood effects (2)
Fluorene	nc	8,200	82,000	0.24	RBC	
Hexachlorobenzene	c	3.6	36	0.001	MCL	
Hexachlorobutadiene <sup>8</sup>	nc/c	40.9/73.4	409/734	0.00086	RBC	
Hexachlorocyclopentadiene	nc	1,200	12,000	0.05	MCL	
Hexachloroethane <sup>8</sup>	nc/c	204/200	2044/2000	0.0048	RBC	
Indeno(1,2,3-cd)pyrene	c	7.8	78	0.000092	RBC	

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Isophorone	c	6,000	60,000	0.07	RBC	Decreased weight effects (2)
n-Nitrosodiphenylamine	c	1,200	12,000	0.014	RBC	
n-Nitrosodipropylamine	c	0.82	8	0.0000096	RBC	
Naphthalene	nc	4,100	41,000	0.0065	RBC	
Nitrobenzene	nc	100	1,000	0.0035	RBC	
p-Chloro-m-cresol	-	NV	NV	NV		Skin effects (8, 12)
p-(Dimethylamino)azobenzene	-	NV	NV	NV		
Pentachlorobenzene	nc	160	1,600	0.029	RBC	
Pentachlorophenol	c	48	480	0.001	MCL	
Phenanthrene	-	NV	NV	NV		
o-Cresol/2-Methylphenol	nc	10,000	100,000	1.8	RBC	Kidney effects (2)
p-Cresol/4-Methylphenol	nc	1,000	10,000	0.18	RBC	
Phenol	nc	61,000	610,000	11	RBC	
Pyrene	nc	6,100	61,000	0.18	RBC	
TAL Metals						
Aluminum	nc	200,000	2,000,000	37	RBC	Blood effects (2)
Antimony	nc	82	820	0.006	MCL	
Arsenic	c	3.8	38	0.01	MCL	
Barium	nc	14000	140,000	2	MCL	
Beryllium	nc	410	4,100	0.004	MCL	
Cadmium	nc	200	2,000	0.005	MCL	Respiratory and skin effects (3, 9)
Calcium	-	NV	NV	NV		
Chromium	nc	610	6,100	0.1	MCL	
Cobalt	nc	4,100	41,000	0.73	RBC	
Copper	nc	8,200	82,000	1.3	AL <sup>4</sup>	
Iron	nc	61,000	610,000	11	RBC	Respiratory (10) and thyroid (3) effects
Lead	nc	1,000 <sup>9</sup>	1,000 <sup>9</sup>	0.015	AL <sup>4</sup>	
Magnesium	-	NV	NV	NV		
Manganese	nc	4,100	41,000	0.73	RBC	
Mercury <sup>10</sup>	nc	20	200	0.002	MCL	
Nickel	nc	4,100	41,000	0.73	RBC	Gastrointestinal effects (2)
Potassium	-	NV	NV	NV		
Selenium	nc	1,000	10,000	0.05	MCL	
Silver	nc	1,000	10,000	0.18	RBC	
Sodium	-	NV	NV	NV		
Thallium	nc	14.4	144	0.002	MCL	Gastrointestinal effects (2)
Vanadium	nc	1,400	14,000	0.26	RBC	
Zinc	nc	61,000	610,000	11	RBC	
Cyanide, Free	nc	4,100	41,000	0.2	MCL	
PCBs						
Total PCBs	c	NA	25 <sup>11</sup>	0.0005	MCL	Reduced birth weight (2)
Arochlor 1016	c	14.3 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	
Arochlor 1221	c	2.9 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	
Arochlor 1232	c	2.9 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	
Arochlor 1242	c	2.9 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	
Arochlor 1248	c	2.9 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	

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Arochlor 1254	c	2.9 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	
Arochlor 1260	c	2.9 <sup>12</sup>	NA <sup>12</sup>	0.0005	MCL	

**Notes:** NV - No Value Available; c = carcinogenic effects; nc = carcinogenic effects; nc/c = noncarcinogenic effects/carcinogenic effects

1 - The direct contact standards are calculated according to procedures utilized in the EPA Region III Risk-based Concentration Table (April 25, 2003 Version with June 17, 2003 update) for industrial soil, except an indoor worker exposure scenario (soil ingestion = 50 mg/day) was used instead of the outdoor worker exposure (soil ingestion = 100 mg/day). The default lead direct contact exposure standard is 1,000 mg/kg based on typical commercial/industrial exposure. Chromium direct contact exposure standard based on Cr<sup>+6</sup>.

2 - The direct contact cleanup goals based on a 1 x 10<sup>-5</sup> risk level for carcinogens and a HQ of 1 for non-carcinogens are applicable if it can be demonstrated that there are no more than 10 carcinogens present in excess of the 1 x 10<sup>-6</sup> risk level, and that none of the noncarcinogens exceeding an HQ of 0.1 have the same target organ. If more than 10 carcinogens are present in excess of the 1 x 10<sup>-6</sup> risk level, the direct contact cleanup goals will be the levels identified for a 1 x 10<sup>-6</sup> excess cancer risk. The cumulative risks for non-carcinogens that have the same target organ must not exceed a HQ of 1, therefore, the direct cleanup goals for non-carcinogens having the same target organ will be the levels identified for a HQ = 0.1.

3 - Determination of whether or not ground water protection standards are met is made by dividing the SPLP concentration by the DAF of 10 and then comparing the concentration to the standard (MCL or RBC). Concentrations lower than the standards are in compliance with the standards.

4 - Safe Drinking Water Act (SDWA) Maximum Contaminant Limit (MCL), or in absence of an MCL, the EPA Region III Risk-based tap water standard. Lead and copper ground water protection action levels (ALs) assumed to be 0.015 mg/L and 1.3 mg/L, respectively, based on SDWA standards.

5 - Target organs are shown for those non-carcinogenic constituents detected in the NTCRA-Buildings samples. If additional non-carcinogenic constituents are detected during future sampling, the table will be revised to include the corresponding target organs.

6 - 1,3-Dichloropropene standard was used.

7 - EPA Region III removed direct contact standard for chloromethane in the April 2003 update of the risk-based concentrations.

8 - 3-Nitoranaline, Hexachloroethane and Hexachlorobutadiene are listed as carcinogens, however, the non-carcinogenic standards at an HQ=0.1 and an HQ=1.0 are less than the carcinogenic standards at 1x10<sup>-6</sup> and 1x10<sup>-5</sup>, respectively. Both non-carcinogenic and carcinogenic standards are shown.

9 - The soil cleanup level for lead of 1000 mg/kg is only value used and is irrespective of the HQ.

10 - Methylmercury direct contact standard was used as the default standard for mercury.

11 - Direct Contact Standards for PCBs are based on PCB remediation waste standards in 40 CFR 761.61, rather than EPA Region III RBCs. The soil cleanup level for PCBs is the only value used and is irrespective of the HQ or cancer risk.

12 - The 1 x 10<sup>-6</sup> Arochlor-specific direct contact cleanup standards for PCBs will only be used to determine if there are more than 10 carcinogens present that exceed the 1 x 10<sup>-6</sup> risk level direct contact cleanup standards. If more than 10 carcinogens exceed the 10<sup>-6</sup> risk level direct contact cleanup standards, then the non-PCB carcinogens will be compared to their respective 1 x 10<sup>-6</sup> risk level direct contact cleanup standards, and the total PCB concentration will be compared to the 25 mg/kg direct contact cleanup standard. If 10 or less carcinogens are present that exceed the 1 x 10<sup>-6</sup> risk level direct contact cleanup standards, the non-PCB carcinogens will be compared to their respective 1 x 10<sup>-5</sup> risk level direct contact cleanup standards and the total PCB concentration will be compared to the 25 mg/kg direct contact cleanup standard. A soil direct contact cleanup standard for the 1 x 10<sup>-5</sup> cancer risk level is not applicable (NA) for PCBs for use at OU-10.

### Target Organ Notes:

(1) Based on naphthalene as a surrogate for 2-methylnaphthalene.

(2) USEPA IRIS data base; USEPA, 2001

(3) Beliles, 1994 (Patty's Industrial Hygiene and Toxicology)

(4) Lewis, 1992 (Sax's Dangerous Properties of Industrial Materials)

(5) ATSDR, 2000 (Toxicological profile for lead)

(6) USEPA, 1997 (HEAST)

(7) Bisesi, 1994 (Patty's Industrial Hygiene and Toxicology)

(8) Cavender, 1994 (Patty's Industrial Hygiene and Toxicology)

(9) ATSDR, 2000 (Toxicological Profile for Chromium)

(10) ATSDR, 2000 (Toxicological Profile for Cobalt)

(11) ATSDR, 2000 (Toxicological Profile for Vanadium)

(12) ATSDR, 2000 (Toxicological Profile for Phenanthrene)